CLAIMS

What is claimed is:

1. An oscillator for use in controlling operation of a pump, comprising:

a first compression chamber;

a second compression chamber; and

a valve having a shuttle member for controlling air flow and a detent mechanism for regulating oscillation of the shuttle member, wherein the shuttle member and the detent mechanism are configured such that the valve regulates operation of the oscillator without the use of an additional valve.

2. The oscillator of claim 1, wherein the valve controls the rate of oscillation of the oscillator.

3. The oscillator of claim 1, wherein a constant air flow is supplied to both the first compression chamber and the second compression chamber, the air flow being alternately exhausted by the valve and detent to control the pneumatic pressure supplied by the oscillator to the pump.

4. The oscillator of claim 3, wherein the detent controls the rate of cycling of the pump.

5. The oscillator of claim 1, further comprising an air inlet port and one or more outlet ports.

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6. The oscillator of claim 5, wherein the one or more outlet ports comprise an exhaust port, a first supply port, and a second supply port.

7. The oscillator of claim 6, wherein the first supply port and the second supply port are coupled to first and second heads of the pump so as to provide pumping force to the pump.

8. The oscillator of claim 7, wherein the shuttle valve further comprises a valve body.

9. The oscillator of claim 8, wherein the valve body includes a plurality of ports for regulating air flow in the oscillator.

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10. An oscillator for controlling operation of a pump, the oscillator utilizing air flow for providing pumping force to the pump and for controlling cycling of the pump, the oscillator comprising:

a first compression chamber;

a second compression chamber;

a channel positioned between the first and second compression chambers; and

a shuttle valve having at least a portion thereof positioned in the channel between the first and second chamber, the shuttle valve comprising:

a shuttle member adapted to control depressurization of the first and second compression chambers so as to create a differential in air pressure between the first and second compression chambers; and

a detent mechanism flexibly coupled to the shuttle member so as to allow movement of the shuttle member only when the differential in air pressure reaches a specified level.

11. The oscillator of claim 10, wherein the shuttle member moves between a first and second position during a cycle of the oscillator.

12. The oscillator of claim 11, wherein the first position is adapted to pressurize the first compression chamber and depressurize the second compression chamber and the second position is adapted to depressurize the first compression chamber and pressurize the second compression chamber.

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13. The oscillator of claim 12, wherein the shuttle member moves between the first and second position to create an oscillating differential in air pressure between the first compression chamber and the second compression chamber.

14. The oscillator of claim 10, wherein the detent mechanism comprises one or more resilient members.

15. The oscillator of claim 14, wherein the detent mechanism further comprises one or more actuation legs.

16. The oscillator of claim 15, wherein the one or more resilient members exert a force on the one or more actuation legs such that the one or more actuation legs exert a force on the shuttle member.

17. The oscillator of claim 16, wherein the force exerted on the shuttle member by the actuation legs allows movement of the shuttle member only when the differential in air pressure between the first and second compression chamber reaches a specified level.

18. The oscillator of claim 17, wherein the shuttle member remains in one of the first or second positions until the differential in air pressure between the first compression chamber and the second compression chamber exceeds the force inhibiting movement of the shuttle member.

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19. The oscillator of claim 18, wherein the configuration of the detent mechanism ensures that the shuttle member will move to the alternative first or second position once the shuttle member is displaced a given amount from the first or second position.

20. The oscillator of claim 15, wherein the detent mechanism further comprises one or more pretension legs.

21. The oscillator of claim 20, wherein the pretension legs can be adjusted to vary the amount of force the one or more actuation legs exert on the shuttle member to permit a user to manually adjust the rate of oscillation of the shuttle member.

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22. An oscillator for controlling operation of a pump, the oscillator utilizing air flow for providing pumping force to the pump and for controlling cycling of the pump, the oscillator comprising:

an oscillator body having a first and second compression chamber, and a channel between the first and second compression chambers;

a shuttle valve having a shuttle member for controlling air flow and a detent mechanism for controlling oscillation of the shuttle member; and

a cycle controller corresponding with the detent mechanism, the cycle controller permitting a user to change the rate of oscillation of the shuttle member such that the need for additional valves or controllers for regulating the rate of oscillation is obviated.

23. The oscillator of claim 22, wherein the cycle controller can be manipulated to control the rate of oscillation of the shuttle member.

24. The oscillator of claim 23, further comprising indicia for indicating the direction in which to manipulate the cycle controller to increase or decrease the rate of oscillation of the oscillator.

25. The oscillator of claim 20, wherein the cycle controller is coupled to one or more pretension legs of the detent mechanism.

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26. The oscillator of claim 25, wherein manipulation of the cycle controller allows a user to increase or decrease the amount of pressure exerted on shuttle member by the actuation legs.

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27. An oscillator for controlling operation of a pump, the oscillator utilizing air flow for providing pumping force to the pump and for controlling cycling of the pump, the oscillator comprising:

a first compression chamber;

a second compression chamber;

a channel between the first and second compression chambers;

an air pressure source providing a consistent air flow to the first and second compression chambers; and

a shuttle valve positioned internal to the channel, the shuttle valve comprising:

a shuttle member having a first position adapted to pressurize the first compression chamber and depressurize the second compression chamber and a second position adapted to depressurize the first compression chamber and pressurize the second compression chamber so as to create a differential in air pressure between the first compression chamber and the second compression chamber, the shuttle member having a rate of oscillation between the first and second positions; and

a detent mechanism for inhibiting movement of shuttle member between the first and second positions until a desired differential in air pressure between the first compression chamber and the second compression chamber has been reached; and

a cycle controller coupled to the detent mechanism, the cycle controller being adapted to change the desired differential in air pressure so as to permit a user to change the rate of oscillation of the shuttle member.

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28. The oscillator of claim 27, wherein the desired differential in air pressure controllable by manipulating the cycle controller.

29. The oscillator of claim 27, further comprising indicia for providing a visual indication of the manner in which to manipulate the cycle controller to increase or decrease the rate of oscillation.

30. The oscillator of claim 29, wherein the indicia comprises an electrical device coupled to a display.

31. The oscillator of claim 30, wherein the indicia indicates the actual oscillation of the oscillator.

32. The oscillator of claim 30, wherein the indicia indicates the estimated rate of oscillation of the oscillator.

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33. An oscillating valve controlling cycling of an oscillator, the oscillator utilizing air flow for providing pumping force to the pump and for controlling cycling of the pump, the oscillating valve comprising:

a shuttle member for controlling air flow; and

a detent mechanism for controlling oscillation of the shuttle member, the detent mechanism permitting a user to change the rate of oscillation of the shuttle member such that the need for additional valves or controllers for regulating the rate of oscillation is eliminated.

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